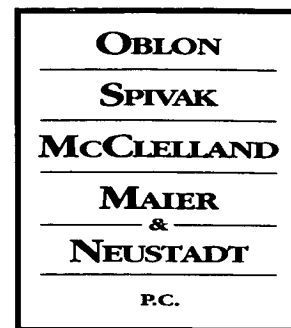




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Docket No.: 220759US0PCT

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

RE: Application Serial No.: 10/069,983
Applicants: Florence L'ALLORET
Filing Date: March 14, 2002
For: FOAMING EMULSIONS AND FOAMING
COMPOSITIONS CONTAINING A POLYMER
COMPRISING WATER-SOLUBLE UNITS AND
UNITS WITH AN LCST, ESPECIALLY FOR
COSMETIC USES
Group Art Unit: 1713
Examiner: EGWIM

SIR:

Attached hereto for filing are the following papers:

**Submission of Supplemental Appeal Brief
Appeal Brief**

Our check in the amount of is attached covering any required fees. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R. 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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DOCKET NO: 220759US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
FLORENCE L'ALLORET : EXAMINER: EGWIM
SERIAL NO: 10/069,983 :
FILED: MARCH 14, 2002 : GROUP ART UNIT: 1713
FOR: FOAMING EMULSIONS AND :
FOAMING COMPOSITIONS
CONTAINING A POLYMER
COMPRISING WATER-SOLUBLE UNITS
AND UNITS WITH AN LCST,
ESPECIALLY FOR COSMETIC USES

SUBMISSION OF SUPPLEMENTAL APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

In response to the Office Communication dated August 24, 2006, a supplemental appeal brief is submitted. Notably, the status of all claims was present in the original brief filed on August 9, 2006 (see page 2, sec. 2). The supplemental brief contains a revised section I (as opposed to section III, which is the related proceedings index) and does not include the withdrawn claims as requested. Also the heading of rejection has been changed.

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
FLORENCE L'ALLORET : EXAMINER: EGWIM, K.
SERIAL NO: 10/069,983 :
FILED: MARCH 14, 2002 : GROUP ART UNIT: 1713
FOR: FOAMING EMULSIONS AND :
FOAMING COMPOSITIONS :
CONTAINING A POLYMER :
COMPRISING WATER-SOLUBLE UNITS :
AND UNITS WITH AN LCST, :
ESPECIALLY FOR COSMETIC USES :

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This brief is submitted in response to the rejections dated March 10, 2006.

REAL PARTY OF INTEREST

The real party of interest herein is L'Oréal of Paris, France.

RELATED APPEALS AND INTERFERENCES

An Appeal has been filed in related application serial no. 10/069,981. This related application is being examined by the same Examiner and contains similar rejections as those outlined below.

STATUS OF CLAIMS

Claims 44-49 and 104-148 are active in this application.

Claims 47-49, 105-109, 111-115, 117, 118, 120-124, 127-130, 132, 133, 137-142 and 145-148 have been withdrawn in view of the Office's restriction requirement.

Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, 143 and 144 are rejected and appealed.

STATUS OF AMENDMENTS

There are no outstanding amendments in this case.

SUMMARY OF CLAIMED SUBJECT MATTER

The invention currently under examination is to a method of lowering the surface tension or the interface tension of water by adding a polymer to the water in an amount sufficient to achieve this effect.

The polymer comprises water-soluble units and units with an LCST,
the units with an LCST having in water a demixing temperature of from 5 to 40 °C at a concentration of 1% by mass in water,
the polymer comprises an oligomer or copolymer of water-soluble units, and
wherein the polymer is water-soluble in a range of 5 to 80°C at a concentration of at least 10 g/l.

As discussed in the specification on page 4, lines 16-25, the invention is based on the discovery that certain polymers meeting this definition have the advantageous property of lowering the surface tension or the interface tension of water and as such particular useful for manufacturing foaming compositions and emulsions. This discovery significantly advances the state of the art, because it enables one to make such foaming compositions and emulsions with smaller amounts of typical emulsifiers and foaming agents (such as surfactants, which have a relatively aggressive negative affect on the skin (see pages 6-7 of the present specification) . Compositions made using these polymers remain stable over a wide temperature range which is a property that is particularly useful in consumer cosmetic products which have to be maintained in various temperatures (e.g., manufacturing, shipping, and storage in a retail store.

In the Examples section of the application, various polymers were prepared that are representative of the claimed invention. In particular as outlined in Table 1 on page 37 of the specification, for example, polymers having polyacrylic acid backbones were used to graft on units with LCST $(EO)_6(PO)_{39}$ (polymer 1) and poly-N-isopropyl-acrylamide (polymer 2).

As described in Example 1 beginning on page 43 through page 45, including Table 3, the surface tensions effects of polymers 1 and 2 upon addition to water were assessed. The measurements were performed at two temperatures, 15°C and 38°C; and compared to the polyacrylic backbone by itself, the $(EO)_6(PO)_{39}$ graft by itself, or the poly-N-isopropyl-acrylamide graft by itself. The results are depicted in Table 3 and summarized on page 45, last paragraph: The results of Table 3 show that a significant reduction in the surface tension of water is obtained with polymers 1 and 2, this reduction being even greater above the demixing temperature.

GROUND TO BE REVIEWED ON APPEAL

- (1) The first issue to be reviewed on appeal is the rejection Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136 and 143-144 under 35 U.S.C. § 112, first paragraph based on the allegation that the claims include new matter.
- (2) The second issue to be reviewed on appeal is the rejection of Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, and 143-144 as being anticipated by U.S. patent no. 4,767,265 ("Merchant").
- (3) The third issue to be reviewed on appeal is the rejection of Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, and 143-144 as being anticipated by U.S. patent no. 4,839,167 ("Yamamoto").
- (4) The fourth issue to be reviewed on appeal is the rejection of Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, and 143-144 as being anticipated by U.S. patent no. 5,338,352 ("Breneman").
- (5) The fifth issue to be reviewed on appeal is the rejection of Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, and 143-144 as being anticipated by JP 61245835 ("Ezaki").
- (6) The sixth issue to be reviewed on appeal is the rejection of Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, and 143-144 as being anticipated by U.S. patent no. 4,274,977 ("Koerner").
- (7) The seventh issue to be reviewed on appeal is the rejection of Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, and 143-144 as being anticipated by U.S. patent no. 4,559,226 ("Fogel").
- (8) The eighth issue to be reviewed on appeal is the rejection of Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, and 143-144 as being anticipated by EP 1055694 ("Yabuta").

- (9) The ninth issue to be reviewed on appeal is the rejection of Claims 44-46, 104, 110, 116, 119, 125, 126, 131, 134-136, and 143-144 as being anticipated by EP 583814 or EP629649 (“the Maroy publications”)

There remains an obviousness-type double patenting rejection in view of copending application serial no. 10/069,981. However, as this case is still pending, review of this rejection is not requested at this time.

ARGUMENTS

Summary of the Argument

There are fundamental differences between the claimed method, i.e., the polymer employed, and those polymers used in the cited prior art references. Specifically, unlike the polymer defined in the claims, the polymers described in the cited prior art exhibited a cloud point (in other words, the polymers of the prior art are NOT water-soluble in a range of 5 to 80°C at a concentration of at least 10 g/l). The art relied upon by the Examiner in the rejections does not describe such polymers, does not lead one to select such polymers, and, in fact, the Examiner has simply failed to provide factual basis to support the rejections.

In maintaining the prior art rejections (which are all clumped together), the Examiner contends that “it is noted that the features upon which applicant relies (i.e., wherein the polymer does not exhibit an LCST or does not have cloud points) are not recited in the rejected claim(s).” (page 4 of the final Office Action of March 10, 2006). It is respectfully submitted that this is an allegation without merit. Specifically, the claims specifically require that the polymer is water-soluble in a range of 5 to 80°C at a concentration of at least 10 g/l, which as one knows means that within the temperature range cited in the claims, the polymer does not exhibit a cloud point or LCST. This fact, which the Examiner has seemingly failed to appreciate, differentiates the claimed invention from the descriptions provided in the prior art.

It is well-settled law that the standard set forth in § 102(b) is that of novelty. Lack of novelty, i.e., anticipation requires strict identity between the claimed invention and that disclosed in the prior art reference. To anticipate a claim, a single prior art source must contain all of the essential limitations of the claim *Verdegaal Bros. v. Union Oil Co. of California* 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Put very simply, the claimed invention is

not described by the cited art with sufficient specificity as to constitute anticipation under U.S. patent law and therefore the rejections under 35 U.S.C. § 102(b) should be REVERSED.

Issue #1

The Examiner contends that the specification does not support the limitation that "the polymer is water-soluble in a range of 5 to 80°C at a concentration of at least 10 g/l" and specifically does not find support for the phrase on pages 4-5 of the specification. It is respectfully submitted that the specification unquestionably provides adequate written description to apprise one in this field that the inventors had possession of the claimed invention. In particular, the specification clearly describes that at a concentration of 0.1% by mass (i.e., 10 g/l) the polymer remains soluble in the water at a temperature from 5 to 80°C because it can lower the surface tension or interface tension of the water. As one can appreciate, if the polymer is not soluble in the water at this temperature, it would not cause such an effect. In addition, the specification supports the claims at page 2, lines 23-27 in relation to page 2, lines 2-8; page 6, lines 30-33, page 7, lines 10-11; and page 8, lines 32-35.

Further in support of the patentability of the claimed invention, Appellants note that the Board of Patent Appeals and Interferences has overturned a rejection made under 35 U.S.C. § 112, first paragraph where the Examiner rejected claims on the grounds that the claim expressions did not appear in the original disclosure (In re Sorenson 3 USPQ2d 1462 (BPAI 1987) - copy attached for convenience). In this case, the terms "binuclear copper complexes of carboxylic acids", "binuclear copper complex of an aliphatic carboxylic acid" and "a binuclear copper complex of an arylcarboxylic acid" were held not to violate 35 U.S.C. § 112, first paragraph in view of the fact that the specification contained four examples of binuclear copper complexes of carboxylic acids and one example of a binuclear

copper complex of an aliphatic carboxylic acid. "Given those working examples together with a broader disclosure of copper complexes of carboxylic acids, both aliphatic and aromatic, we have no doubt that the Applicants' disclosure *reasonably conveys to the skilled artisan that Appellant had possession of the subject matter now claimed.*" Id. at 1464 (italics added). In dicta the BPAI stated "we are mindful that Appellants' specification need not describe the claimed invention in *ipsis verbis* to comply with a written description requirement" Id. at 1463, and "the test is whether the originally filed specification disclosure *reasonably* conveys to a person having ordinary skill that Applicant had possession of the subject matter later claimed." Id. at 1464 citing to In re Kaslow 217 U.S.P.Q. 1089 (CAFC 1983).

The decision in Sorenson is relevant to the present rejection and support the claimed phrase that is rejected by the Examiner. Therefore, the present claims does not represent new matter and was described in the original specification in such a way as to reasonably convey to one of ordinary skill in the art that the inventors had possession of the claimed invention.

Issue # 2

Merchant does not describe, with any specificity, the polymer employed in the claimed method. In fact, assessment of the polymers Merchant does disclose would lead one to different polymers.

The polymers disclosed in Merchant do not contain an oligomer or copolymer of water-soluble units as claimed (see the maleic anhydride grafted to an alkyl phenol formaldehyde resin in col. 6, lines 41-49), and the polymers disclosed in Merchant do not contain LCST units, which are one of the limitations that defines the claims over this reference—see the p-nonyl phenyl formaldehyde resin having 10 moles of ethylene oxide in the Examples of Merchant (see col. 10, lines 42-45 and col. 11, lines 29-30).

This formaldehyde resin with 10 moles of ethylene oxide contained in the polymers are not LCST units as has been clearly shown in the Malcolm and Rowlinson publication, now of record. What becomes clear from this publication is that the Merchant polymers described are those that have no LCST. In this Malcolm publication, Figure 6 (Page 926) shows the phase diagrams for polyethylene oxide (indicated in squares and crosses) in which above the curve there exists two phases, below the curve there exists one phase, and the lowest point of the curve defines the LCST. Therefore, this Figure shows that as the molecular weight of the polyethylene oxide gets smaller, the two phase domain also gets smaller. Also illustrated is that for a POE of 3000, the two phase domain is indicated as the oval in the Figure. Taken together then, 10 units of polyethylene oxide as is the case in Merchant would only exhibit 1 phase, i.e., no LCST.

In maintaining this rejection previously, the Examiner has stated that the teachings of the reference are not as limited as the examples illustrated in the above-discussion. The point is missed. The point here is that the species specifically exemplified by Merchant are exemplary of Merchant's emulsifiers and are simply not the same polymers as defined in the

claimed method and that absent such a description, Merchant does not provide the requisite disclosure to select monomers of water-soluble and LCST units and arrange them in the manner that would be the same as the polymer defined in the claimed method. Using the language from MPEP 2131.02, one of ordinary skill in the art would not be able to "at once envisage" the polymers set forth in the claimed method.

Moreover, Merchant does not describe the arrangement set forth in dependent Claim 104, in which the polymer is either

- (1) water-soluble units alternating with units with an LCST; or
- (2) a graft polymer whose backbone is formed from water-soluble units and bears LCST grafts.

In fact, the Office has failed to provide any reasons why this claim has been rejected in view of Merchant.

Moreover, Merchant does not describe or provide any suggestion for providing the arrangement in Claim 116, wherein water-soluble units have a molar mass ranging from 1000 g/mol to 5 000 000 g/mol when they constitute the water-soluble backbone of a grafted polymer, or a molar mass ranging from 500 g/mol to 100 000 g/mol when they constitute a block of a multiblock polymer or when they constitute the grafts of a grafted polymer. In fact, the Office has failed to provide any reasons why this claim has been rejected in view of Merchant.

In view of this, the claims cannot be anticipated by the Merchant disclosure.

Issue #3

Yamamoto describes hair care products with an emulsion containing a hair fixative polymer which is water soluble (col. 2, line 10-23 and col. 3, lines 45-46) and can be one of several polymers listed in col. 3, lines 51-63 none of which are the types of polymers claimed. In response to the Office's comment on page 4 of the Official Action, it is stressed that just because Yamamoto may disclose a particular monomer that may have LCST properties (referring to the statement on page 4 of the Office Action of March 3, 2005 concerning vinylpyrrolidone), there is insufficient disclosure that permits one to envision the types of polymers used in the claimed method. That is, Yamamoto does not describe in any manner, polymers having an oligomer or copolymer of water-soluble units, LCST units with specified properties such that the polymer, as a whole, is water-soluble in the temperature and concentration ranges set forth in the claims.

It should be noted that the Office has already recognized these differences in the related co-pending application, US serial no. 10/069,981, by withdrawing the rejection based on Yamamoto in view of many of the same elements of the polymer as claimed herein. The Office has not provided any additional reasons why this rejection remains in this case, nor in the final office action, are there any reasons whatsoever as to why this rejection has been maintained.

Issue #4

Breneman fails to describe with any specificity polymers meeting the definition of the polymer set forth in the claimed method.

The polymers that Brenemann describes are organomodified silicone emulsifiers (col. 2, line 13) in which heating and agitation are required to form an oil-in-water emulsion (col. 3, lines 34-35). Breneman also describes a polyether modified polysiloxane, which is a copolymer of hydrophilic and hydrophobic monomers. The fact that the polymers in Breneman are not the same is missed by the Office's conclusion set forth on page 4 of the Office Action mailed March 3, 2005 (i.e., "the water-soluble units and the LCST units are one in the same"). The Brenemann polymers do not contain water-soluble units and the specific types of LCST units in the polymer having all of the features as set forth in the claims—oligomer or copolymer of water-soluble units, and water soluble within defined temperature and concentration ranges.

Again it should be noted that the Office has already recognized these differences in the related co-pending application, US serial no. 10/069,981, by withdrawing the rejection based on Brenemann in view of many of the same elements of the polymer as claimed herein. The Office has not provided any additional reasons why this rejection remains in this case, nor in the final office action, are there any reasons whatsoever as to why this rejection has been maintained.

Issue #5

Ezaki describes a nonionic surfactant with a specific cloud point: see “Purpose” on page 1 “To stably dissolve an emulsion in water without receiving the effect of the temp. of dissolving water, by adding a nonionic surfactant **having a specific cloud point** to a water . . .” See also “Constitution” “. . .nonionic surfactant polyethylene glycol type one) having a cloud point of . . .”

Ezaki does not describe any polymer as required in the present claims, having water-soluble and LCST units, comprises an oligomer or copolymer of water-soluble units, **and which is water-soluble within specified temperature and concentrations ranges**. The Office has provided no specific reasons or specific explanation as to why this rejection has been maintained.

Issue #6

Koerner describes an alkyl polyether at the top of col. 8, which polymer has a cloud point, i.e., the polymer exhibits an LCST, at a specific temperature and concentration (col. 8, lines 1-6). This polymer, however, is different from the polymer defined in the claims where the polymer is water-soluble in a specified range and concentration (see Claim 44).

Moreover, the polymers described elsewhere in Koerner, e.g., columns 5 and 6, also have a cloud point (see col. 6, lines 24-29) and thus are not the same as the polymer defined in the claimed dispersion.

In maintaining the rejection in the final Office Action, the Office proffers no explanation as to why the claims have been continually rejected over this reference. In a previous Office Action of June 29, 2005, the rejection based on Koerner was maintained, at least in part, because “the particular polymer of example 8 has a cloud point at a higher concentration than the concentration recited in the claims.” (Page 4 of the Official Action) However, as is quite apparent that the polymers used in the claimed method do not have a cloud point or LCST (i.e., are water-soluble within a specified concentration and temperature ranges) and distinguishes the claims from the description provided by Koerner.

Issue #7

The polymers of Fogel have a cloud point, which clearly makes those polymers different from the polymers used in the claimed method (i.e., are water-soluble within a specified concentration and temperature ranges).

In maintaining the rejection in the final Office Action, the Office proffers no explanation as to why the claims have been continually rejected over this reference. In a previous Office Action of June 29, 2005, the Office stated: “applicant appears to be ignoring the polyoxyethylene portions of the water-soluble polymers, i.e., wherein y is from 1 to 20.”

This disclosure in Fogel was not ignored and moreover, is not particularly relevant to the claimed invention. These polyoxyethylene portions are the water-soluble portion of the alkoxylate esters. Said another way, the $-(OCH_2CH_2)_y$ is the water-soluble portion and $(R_2)_x$ is the LCST portion of the alkoxylate ester.

Specifically, the alkoxylate ester of a specific formula where R_2 can be either (a) or (b) and x is from 1 to 10 (see col. 2, lines 53-62) are those having cloud points within the range that the claimed polymers are to be water-soluble. The technical basis for this distinction is reiterated below.

Polyoxypropylene groups, e.g., when x is 10, have a molecular weight of 580 g/mol and have a demixing temperature, i.e., cloud point, at a 1% concentration of 65°C (see P600E) (Dow Corning Technical Sheet: polypropylene glycol—of record). Furthermore, where x is less than 10, the demixing temperature, i.e., cloud point, is much greater than 65°C (see, e.g., P400E). Therefore, the polymers in Fogel are unquestionably different from the polymer defined in the claims

Issue #8

Yabuta describes a block copolymer of ethylene glycol and propylene glycol, which polymer has a cloud point, i.e., the polymer exhibits an LCST, in the 30 to 90°C range (see [0096] and [0097] on page 11). This polymer, however, is different from the polymer defined in the claims where the polymer does not exhibit an LCST and remains soluble in water (i.e., see Claim 44: “water-soluble within a specified concentration and temperature ranges”).

In maintaining the rejection in the final Office Action, the Office proffers no explanation as to why the claims have been continually rejected over this reference. The previous explanations as to the differences between the claims and Yabuta were also not specifically addressed in the final Office Action.

As explained above, the claims define the manner in which the polymers do not have an LCST, i.e., are water soluble within defined temperature and concentration ranges. As the polymers disclosed by Yabuta have cloud points within this range, this means that they are not water-soluble in the manner as required for the polymers used in the claimed methods.

Issue #9

The Maroy publications are acknowledged and discussed on page 1, lines 24-25 and page 2, lines 10-14 of the present specification, noting that documents [4] and [5] are the Maroy publications. The Maroy publications describe a polymer with water-soluble groups and LCST groups (page 2, lines 26-30 of EP '814). Maroy also describes that the groups with LCST can be copolymerized with the water-soluble groups or grafted onto a hydrosoluble skeleton (page 2, lines 34-44 of EP '814).

Maroy does not describe a polymer containing LCST units having a demixing temperature of 5 to 40°C at 1% by mass in water in the claimed method nor provide any description that would lead one to the polymers that are water-soluble in a temperature and concentration as set forth in the claims under active consideration. In fact, the LCST units described in the Maroy publications do NOT have, in water, a demixing temperature of from 5 to 40°C at 1% by mass in water. Specifically, on page 2, lines 53-56 and page 3, lines 2-3 of EP '814 and col. 2, line 54 to col. 3, line 4, Maroy describes that the LCST units selected from polyethyleneglycol (POE), polyoxypropylene (POP) or polyoxide of ethylene and propylene (POEP). Furthermore, Examples 1.1, 1.2, 1.3, and 1.4 of EP '814 (Maroy) on pages 3-4, all describe polymers with POE5 as the LCST units, which is polyethyleneglycol with a molecular weight of 5000 g/mol. However, these polymers have a demixing temperature above 100°C at a concentration of 1 % by mass (see page 5, line 41, page 6, lines 37-39, and page 6, lines 57-59 of EP '814). Therefore, these polymers cannot be the same as the polymer defined in the claimed dispersion (having a demixing temperature of 5 to 40°C at 1% by mass in water).

In Example 2.3 (page 7) of EP '814 (Maroy), the polymer contains POP of a molecular weight of 600 as the LCST unit. However, unlike the polymer in the claimed dispersion, this polymer of Maroy has a demixing temperature of 48°C at a concentration of 1

% by mass. In Example 2.5 (pages 7-8) of EP '814 (Maroy), the polymer contains a POEP polymer with a molecular weight of approximately 1100. However, unlike the polymer in the claims, this polymer has a demixing temperature above 60°C (see Figure 3 of EP '814).

In the Examples of EP '649, Maroy describes the same example as 1.2 from EP '814 (see the reference to French application 9210224, which is the priority application of EP '814 in col. 6, line 40 and lines 54-56) and Examples 4 and 5 which include POE with a molecular weight of about 5000. For the same reasons as discussed above concerning EP '814, these specifically described polymers have a demixing temperature above 60°C and are therefore NOT the same as the polymer set forth in the claims.

In maintaining the rejection in the final Office Action, the Office proffers no explanation as to why the claims have been continually rejected over this reference. In a previous Office Action of June 29, 2005, it is stated that "the Examiner fails to find any specific teachings of demixing temperatures above 40°C at 1% by mass in water as suggested by applicant. However, it is reasonable that the LCST units of Maroy et al., would possess the presently claimed properties since the LCST units are identical to applicants." Applicants disagree and have already provided evidence of the differences.

In summary, uncontested evidence has been provided that clearly shows the polymers described by the Maroy publications do not necessarily, each and every time, have the properties of the polymer defined in the claimed method. The Office has simply maintained the rejections providing no specific reasons or any evidence that contradicts the evidence provided.

CONCLUSION

In view of the above remarks, Appellants request that all of the rejections be
REVERSED.

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APPENDIX 1 (CLAIMS)

44. (Previously Presented) A method of lowering the surface tension or the interface tension of water comprising adding a polymer comprising water-soluble units and units with an LCST, the units with an LCST having in water a demixing temperature of from 5 to 40 °C at a concentration of 1% by mass in water, to water in an amount sufficient to lower the surface tension or the interface tension of water, wherein the polymer comprises an oligomer or copolymer of water-soluble units, and wherein the polymer is water-soluble in a range of 5 to 80°C at a concentration of at least 10 g/l.

45. (Previously Presented) The method as claimed in claim 44, in which the lowering of the surface tension or of the interface tension of water is at least 15 mN/m for a concentration of polymer in water of 0.1% by mass in the temperature range from 5 to 80 °C.

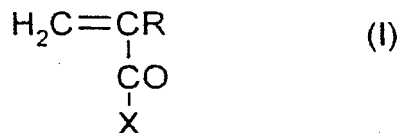
46. (Previously Presented) The method as claimed in claim 44, in which the lowering of the surface tension or of the interface tension of water is of at least 20 mN/m for a concentration of polymer in water of 0.1% by mass when the temperature is higher than the demixing temperature of the units with an LCST at this concentration.

104. (Previously Presented) The method as claimed in Claim 44, wherein the polymer is in the form of a block polymer comprising water-soluble units alternating with units with an LCST, or in the form of a grafted polymer whose backbone is formed from water-soluble units and which bears grafts consisting of units with an LCST or a grafted polymer whose backbone is formed from units with an LCST and which bears grafts consisting of water-soluble units.

110. (Previously Presented) The method as claimed in Claim 44, wherein the water-soluble units are obtained by free-radical polymerization of at least one monomer selected from the group consisting of:

(meth)acrylic acid;

vinyl monomers of formula (I) below:



wherein:

R is from H, -CH₃, -C₂H₅ or -C₃H₇, and

X is:

OR' alkyl oxides wherein R' is a linear or branched, saturated or unsaturated hydrocarbon radical containing from 1 to 6 carbon atoms, optionally substituted with at least one halogen atom; a sulphonic group, a sulphate group, a phosphate group; a hydroxyl group; a primary amine; a secondary amine; a tertiary amine; or a quaternary amine group of the formula N⁺R₁R₂R₃ wherein R₁, R₂ and R₃ are, independently, a linear or branched, saturated or unsaturated hydrocarbon radical containing 1 to 6 carbon atoms, with the proviso that the sum of the carbon atoms of R' + R₁ + R₂ + R₃ does not exceed 7; and

-NH₂, -NHR₄ and -NR₄R₅ groups in which R₄ and R₅ are, independently of each other, linear or branched, saturated or unsaturated hydrocarbon radicals containing 1 to 6 carbon atoms, with the proviso that the total number of carbon atoms in R₄ + R₅ does not exceed 7, the said R₄ and R₅ optionally being substituted with a halogen atom (iodine, bromine, chlorine or fluorine); a hydroxyl (-OH); sulphonic (-SO₃⁻), sulphate (-SO₄⁻); phosphate (-PO₄H₂); primary amine (-NH₂); secondary amine (-NHR₁),

tertiary amine ($-NR_1R_2$) and/or quaternary amine ($-N^+R_1R_2R_3$) group with R_1 , R_2 and R_3 being, independently of each other, a linear or branched, saturated or unsaturated hydrocarbon radical containing 1 to 6 carbon atoms, with the proviso that the sum of the carbon atoms of $R_4 + R_5 + R_1 + R_2 + R_3$ does not exceed 7;

maleic anhydride;

itaconic acid;

vinyl alcohol of formula $CH_2=CHOH$;

vinyl acetate of formula $CH_2=CH-OCOCH_3$;

N-vinyl lactams such as N-vinylpyrrolidone, N-vinylcaprolactam and N-butyrolactam;

vinyl ethers of formula $CH_2=CHOR_6$ in which R_6 is a linear or branched, saturated or unsaturated hydrocarbon radical containing from 1 to 6 carbon atoms;

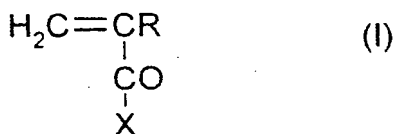
water-soluble styrene derivatives, especially styrene sulphonate;

dimethyldiallylammonium chloride; and vinylacetamide.

116. (Previously Presented) The method as claimed in Claim 44, wherein the water-soluble units have a molar mass ranging from 1000 g/mol to 5 000 000 g/mol when they constitute the water-soluble backbone of a grafted polymer, or a molar mass ranging from 500 g/mol to 100 000 g/mol when they constitute one block of a multiblock polymer or when they constitute the grafts of a grafted polymer.

119. (Previously Presented) The method as claimed in Claim 44, wherein the units with an LCST comprises one or more of the following:

polyethers; polyvinyl methyl ethers; polymeric N-substituted acrylamide derivatives;
and a vinyl monomer corresponding to formula (I):



wherein:

R is from H, -CH₃, -C₂H₅ or -C₃H₇, and

X is:

OR' alkyl oxides wherein R' is a linear or branched, saturated or unsaturated hydrocarbon radical containing from 1 to 6 carbon atoms, optionally substituted with at least one halogen atom; a sulphonic group, a sulphate group, a phosphate group; a hydroxyl group; a primary amine; a secondary amine; a tertiary amine; or a quaternary amine group of the formula N⁺R₁R₂R₃ wherein R₁, R₂ and R₃ are, independently, a linear or branched, saturated or unsaturated hydrocarbon radical containing 1 to 6 carbon atoms, with the proviso that the sum of the carbon atoms of R' + R₁ + R₂ + R₃ does not exceed 7; and

-NH₂, -NHR₄ and -NR₄R₅ groups in which R₄ and R₅ are, independently of each other, linear or branched, saturated or unsaturated hydrocarbon radicals containing 1 to 6 carbon atoms, with the proviso that the total number of carbon atoms in R₄ + R₅ does not exceed 7, the said R₄ and R₅ optionally being substituted with a halogen atom (iodine, bromine, chlorine or fluorine); a hydroxyl (-OH); sulphonic (-SO₃⁻), sulphate (-SO₄⁻);

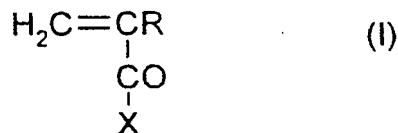
phosphate ($-\text{PO}_4\text{H}_2$); primary amine ($-\text{NH}_2$); secondary amine ($-\text{NHR}_1$), tertiary amine ($-\text{NR}_1\text{R}_2$) and/or quaternary amine ($-\text{N}^+\text{R}_1\text{R}_2\text{R}_3$) group with R_1 , R_2 and R_3 being, independently of each other, a linear or branched, saturated or unsaturated hydrocarbon radical containing 1 to 6 carbon atoms, with the proviso that the sum of the carbon atoms of $\text{R}_4 + \text{R}_5 + \text{R}_1 + \text{R}_2 + \text{R}_3$ does not exceed 7;

a monomer selected from the group consisting of maleic anhydride, itaconic acid, vinylpyrrolidone, styrene and its derivatives, dimethyldiallylammonium chloride, vinylacetamide, vinyl ethers and vinyl acetate derivatives; or polyvinylcaprolactam; copolymers of vinylcaprolactam and a vinyl monomer corresponding to formula (I).

125. (Previously Presented) The method as claimed in Claim 44, wherein the molar mass of the units with an LCST is from 500 to 5300 g/mol.

126. (Previously Presented) The method as claimed in Claim 125, wherein the molar mass of the units with an LCST is from 1500 to 4000 g/mol.

131. (Previously Presented) The method as claimed in Claim 44, wherein the units with an LCST comprise
a polyvinylcaprolactam;
a copolymer of vinylcaprolactam and of a vinyl monomer corresponding to formula (I):



wherein:

R is from H, -CH₃, -C₂H₅ or -C₃H₇, and

X is:

OR' alkyl oxides wherein R' is a linear or branched, saturated or unsaturated hydrocarbon radical containing from 1 to 6 carbon atoms, optionally substituted with at least one halogen atom; a sulphonic group, a sulphate group, a phosphate group; a hydroxyl group; a primary amine; a secondary amine; a tertiary amine; or a quaternary amine group of the formula N⁺R₁R₂R₃ wherein R₁, R₂ and R₃ are, independently, a linear or branched, saturated or unsaturated hydrocarbon radical containing 1 to 6 carbon atoms, with the proviso that the sum of the carbon atoms of R' + R₁ + R₂ + R₃ does not exceed 7; or

a monomer selected from the group consisting of maleic anhydride, itaconic acid, vinylpyrrolidone, styrene; styrene derivatives, dimethyldiallylammonium chloride, vinylacetamide, vinyl alcohol, vinyl acetate, vinyl ethers, and vinyl acetate derivatives.

134. (Previously Presented) The method as claimed in Claim 44, wherein the proportion by mass of the units with an LCST is from 5 to 70% relative to the polymer.

135. (Previously Presented) The method as claimed in Claim 134, wherein the proportion by mass of the units with an LCST is from 20 to 65% relative to the polymer.

136. (Previously Presented) The method as claimed in Claim 134, wherein the proportion by mass of the units with an LCST is from 30 to 60% relative to the polymer.

143. (Previously Presented) The method as claimed in Claim 44, wherein the concentration by mass of the polymer in the aqueous phase is less than or equal to 5%.

144. (Previously Presented) The method as claimed in Claim 143, wherein the concentration by mass of the polymer in the aqueous phase is from 0.01% to 5%.

APPENDIX II (EVIDENCE)

The present specification as originally filed at page 4, lines 16-25.

The present specification as originally filed at pages 6-7.

The present specification as originally filed at page 37 including Table 1.

The present specification as originally filed at page 43 through page 45, including
Table 3.

Malcolm and Rowlinson publication (1957), entered into the record on May 25, 2005

Dow Corning Technical Sheet: Propylene glycol, entered into the record on May 25,
2005.

RELATED PROCEEDINGS APPENDIX

An appeal has been filed in U.S. application serial no. 10/069,981, a case that is related to the present application.